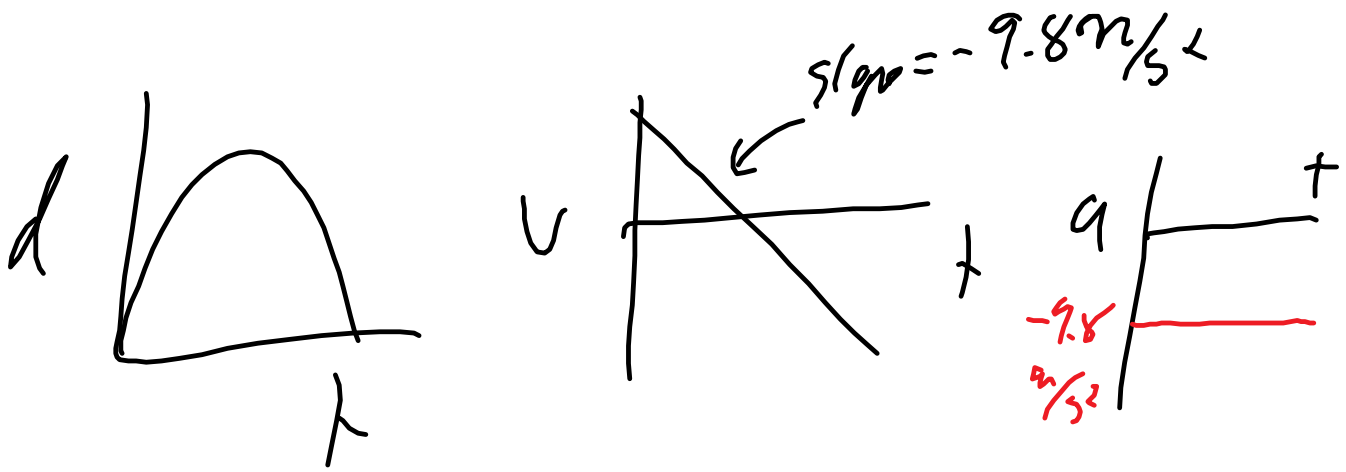
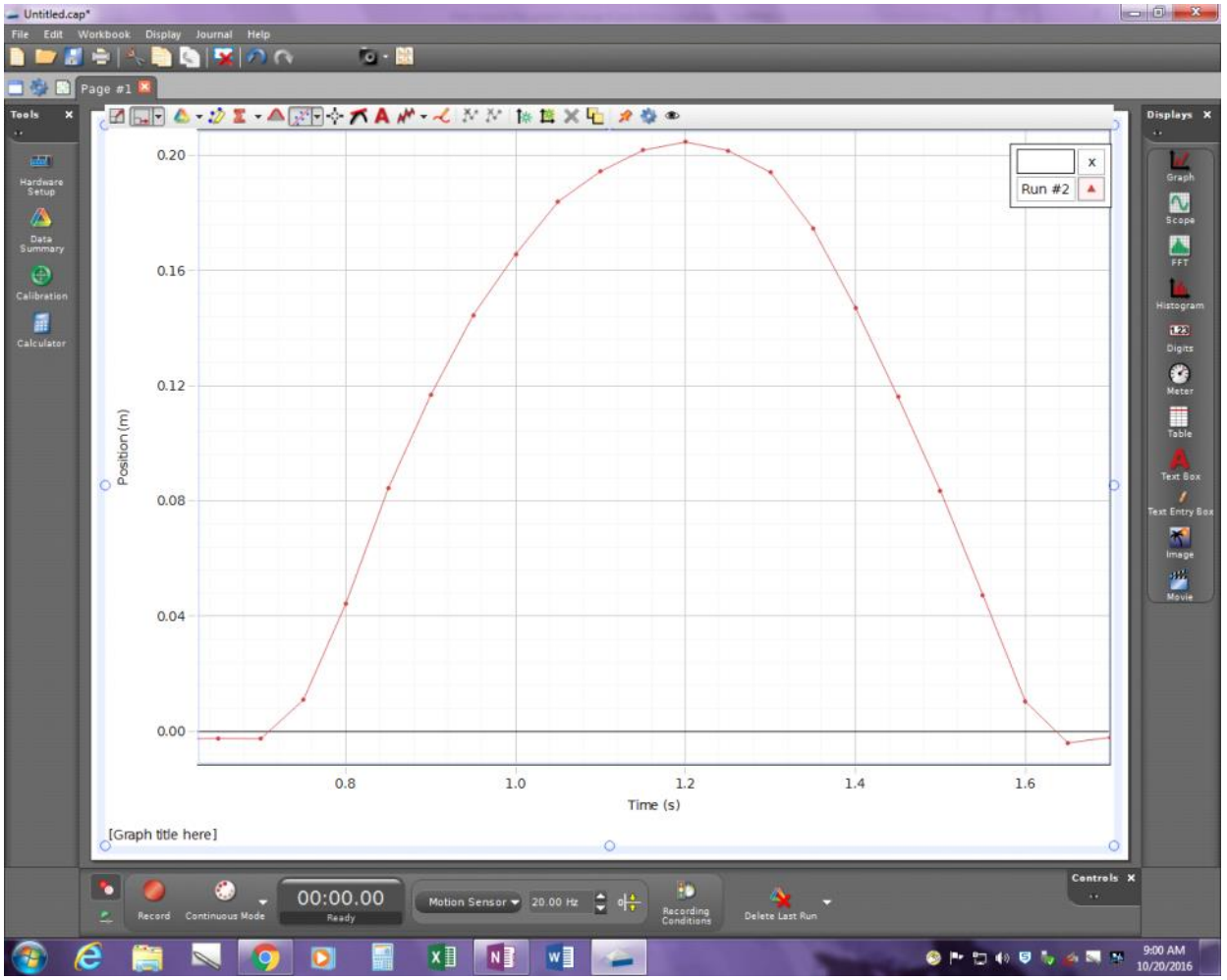
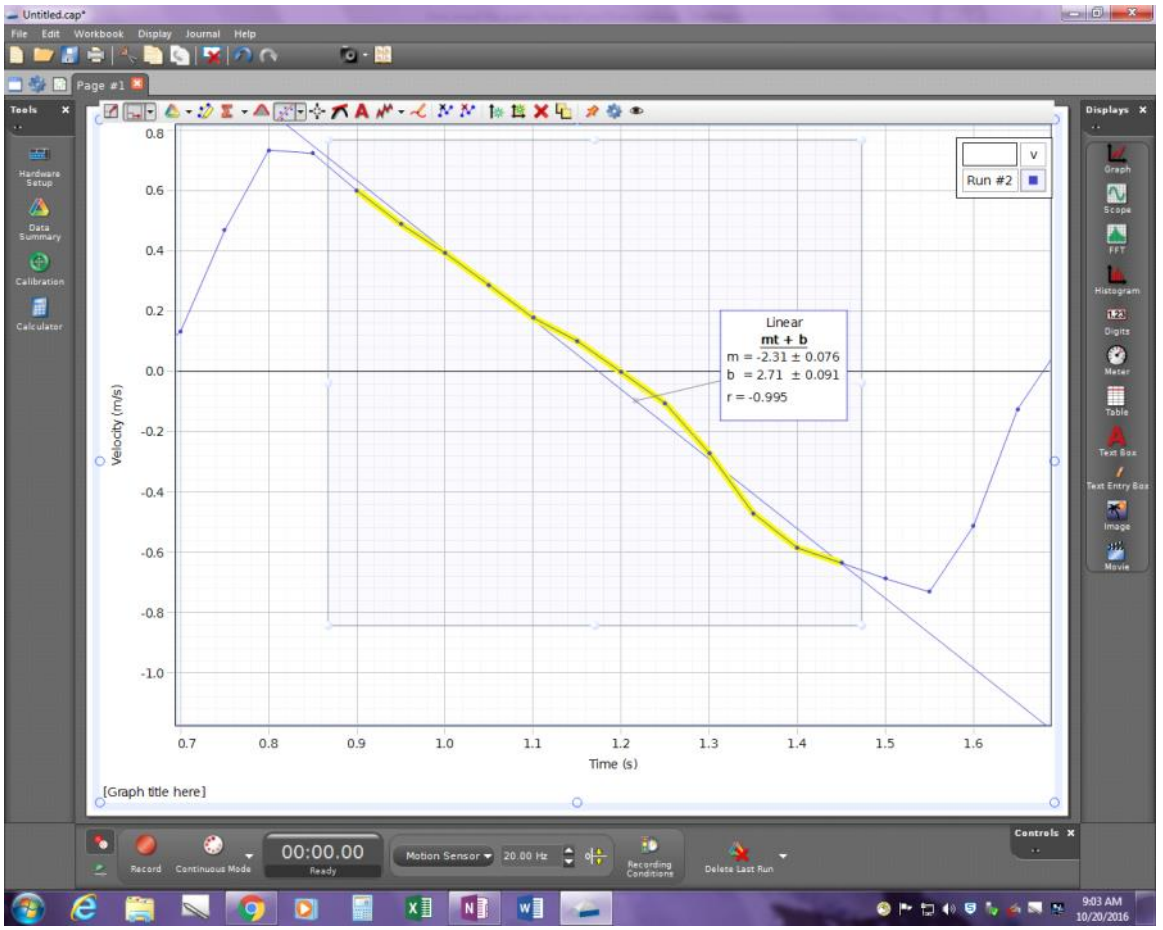
How would the graphs change if you threw a balloon instead of a basketball?
d-t, v-t, a-t

moon landing video
https://www.youtube.com/watch?v=5C5_dOEyAfk
feather videos
https://www.youtube.com/watch?v=_XJcZ-KoL9o&feature=related
http://io9.gizmodo.com/you-know-how-this-experiment-ends-but-you-should-watch-1653628513?utm_campaign=socialflow_io9_facebook&utm_source=io9_facebook&utm_medium=socialflow

Reminder
When Jack threw a basketball up we observed:
\




Untitled.cap*
File Edit Workbook Display Journal Help
Page #1
Tools
Hardware Setup
Data Summary
Calibration
Calculator
Displays
Graph
Scope
FFT
Histogram
Digits
Meter
Table
Text Box
Text Entry Box
Image
Movie
Run #2
x
0.20
0.16
0.12
0.08
0.04
0.00
Position (m)
0.8
1.0
1.2
1.4
1.6
Time (s)
[Graph title here]
Record
Continuous Mode
00:00.00
Ready
Motion Sensor
20.00 Hz
Recording Conditions
Delete Last Run
Controls
9:00 AM
10/20/2016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Text Entry Box
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Movie
Run #2
v
Linear
mt + b
m = -2.31 ± 0.076
b = 2.71 ± 0.091
r = -0.995
0.8
0.6
0.4
0.2
0.0
-0.2
-0.4
-0.6
-0.8
-1.0
Velocity (m/s)
0.7
0.8
0.9
1.0
1.1
1.2
1.3
1.4
1.5
1.6
Time (s)
[Graph title here]
Record
Continuous Mode
00:00.00
Ready
Motion Sensor
20.00 Hz
Recording Conditions
Delete Last Run
Controls
9:03 AM
10/20/2016

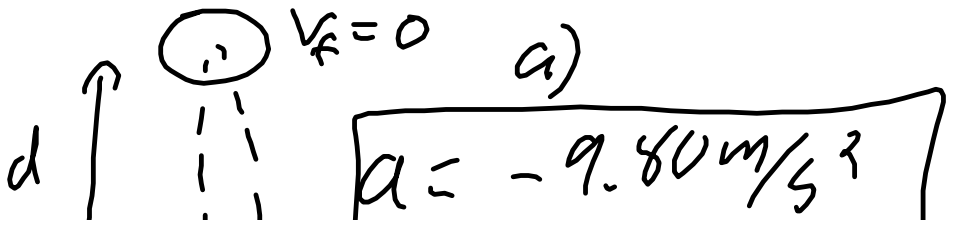
the acceleration of the balloon was only 2.3m/s^2 ish, changing at different points as the air resistance changed.

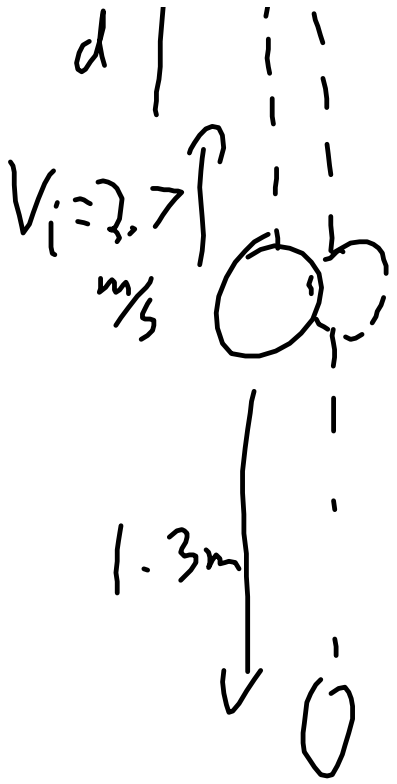
So: objects accelerate at 9.8 m/s^2 only if air resistance is negligible relative to the force of gravity - and if you are near Earth.

eg.
AJ threw the basketball up at 2.7 m/s.

a) what is the acceleration of the basketball if air resistance is negligible?
b) How high does the ball go?
c) How long does it take for the ball to go up and down to the same level?
d) How fast is the ball moving at i) the top ii) the same level ii) the floor 1.30 m below the throwing point.
e) if AJ threw the basketball on the moon with acceleration of 1.6m/s^2 how would your answers to b and c change?
f) $v_f=at+v_i$ $d=1/2at^2 + v_it$ $v_f^2=2ad+v_i^2$ $d=1/2(v_{avg})t$

p77-80
practice problems 25-32 CR 2.1-2.4





$a = -9.80\ m/s^2$

b) $V_f^2 = V_i^2 + 2ad$

$0 = (2.7\ m/s)^2 + 2(-9.8\ m/s^2)d$

$d = \frac{2.7^2}{2(-9.8)} = 0.37m$

c) $t = ?$ $V_i = 2.7\ m/s$

$a = -9.8\ m/s^2$ $d = 0$

$d = \frac{1}{2}at^2 + V_i t$

$0 = \frac{1}{2}(-9.8\ m/s^2)t^2 + 2.7\ m/s\ t$

$t = \frac{-2.7\ m/s}{-\frac{1}{2}9.8} = 0.55s$

d) i) $V_{top} = 0$

ii) $V_{same\ level} = 2.7\ m/s$

ii) $V_{same\ level} =$ [illegible]

iii) $d = 1.3\,m \quad a = -9.8\,m/s^2$

$V_f = ? \quad V_i = +2.7\,m/s$

$V_f^2 = V_i^2 + 2ad$

$V_f^2 = 2.7^2 + 2(-9.8)(-1.3)$

$V_f = 5.7\,m/s$ ✓

Block 1-2

Hand in cart lab.
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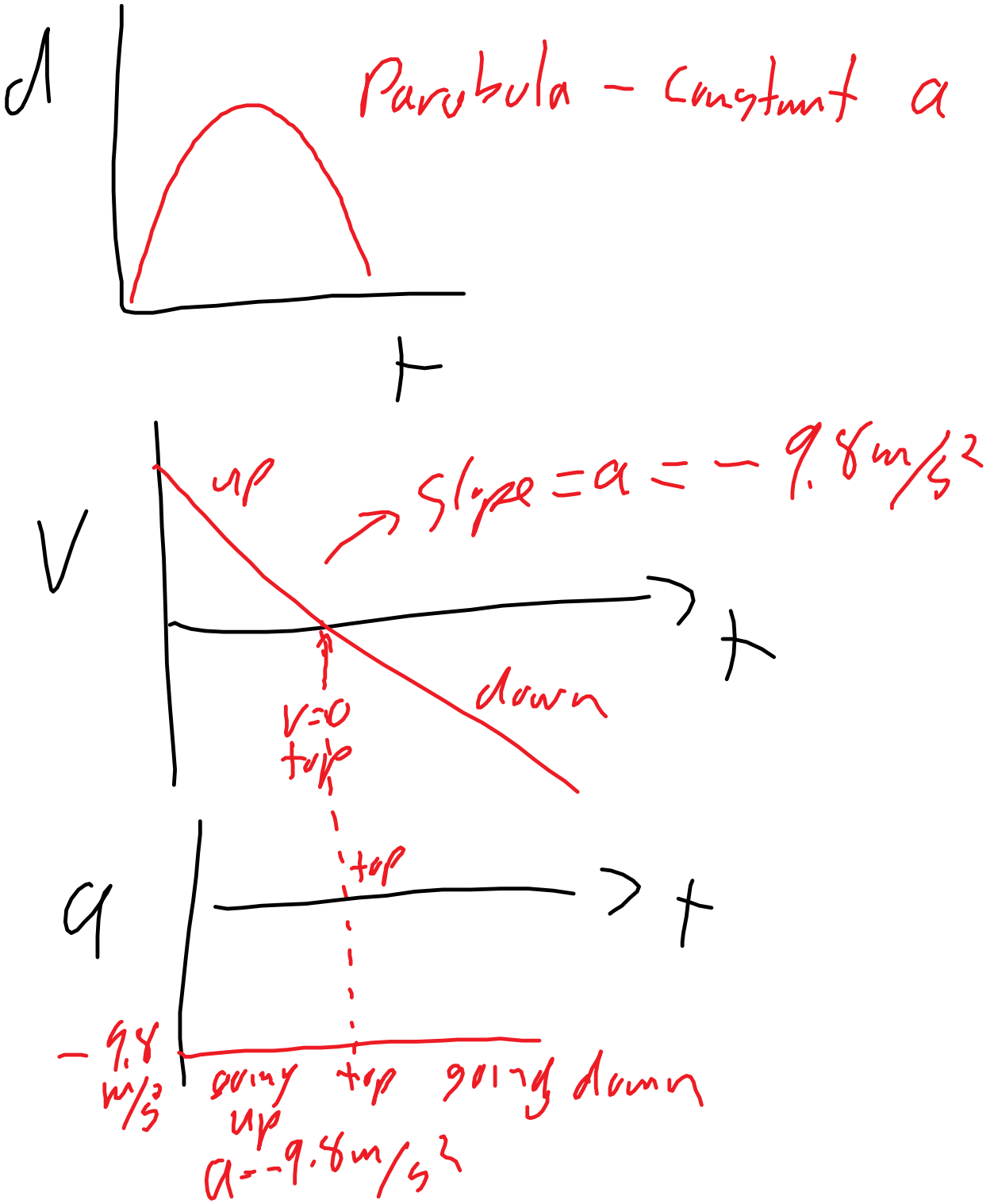
AJ threw the basketball up



AJ threw the basketball up at 2.7 m/s.

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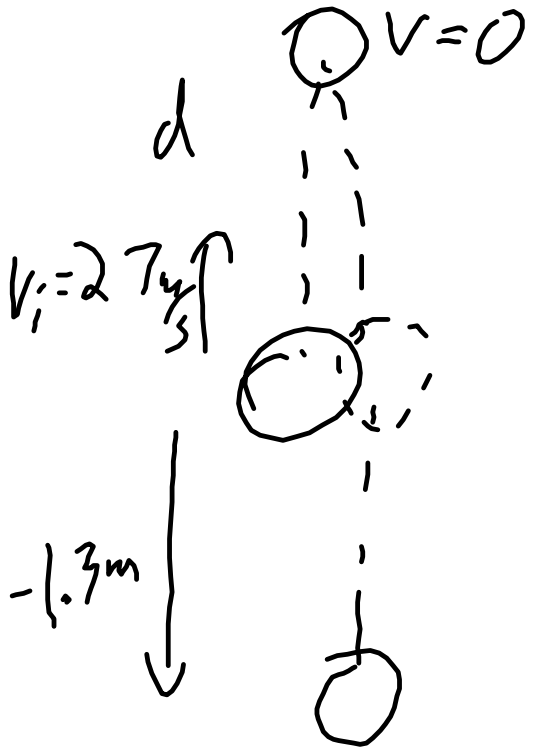

a) $a = -9.8\ m/s^2$

b) $d = ?$ $V_i = 2.7\ m/s$

$a = g = -9.8\ m/s^2$ $V_f = 0$

$V_f^2 = V_i^2 + 2ad$

$0 = (2.7\ m/s)^2 + 2(-9.8\ m/s^2)d$

$d = \frac{-2.7^2}{2(-9.8)} = 0.37\ m$

c) $t = ?$ $v_i = 2.7\,m/s$ $a = -9.8\,m/s^2$

$d = 0$

$d = \frac{1}{2}at^2 + v_i t$

$0 = \frac{1}{2}(-9.8\,m/s^2)t^2 + 2.7\,m/s\,t$

$t = \frac{-2.7\,m/s}{\frac{1}{2}(-9.8\,m/s^2)} = \boxed{0.55\,s}$

d) i) top $v = 0$

ii) same level $v = 2.7\,m/s$ going down

$v_f^2 = v_i^2 + 2ad$

iii) $d = -1.3\,m$ (ignore up/down)

$v = 2.7\,m/s$ $a = -9.8$

v_i $a = -1.0 m/s^2$

$V_f = ?$

$V_f^2 = V_i^2 + 2ad$

$V_f^2 = (2.7 m/s)^2 + 2(-9.8)(-1.3$

$V_f^2 = 7.29 m^2/s^2 + 25.48 m^2/s^2$

$V_f^2 = 32.77 m^2/s^2$

$V_f = 5.7 m/s$ down